Yaxiio.com

M20 · English · bolt-torque-chart-m20-en

Bolt Torque Chart — M20

M20 · 6 property classes · 5 friction states · N·m (typ / min–max) · coarse + fine thread

M20

N·m · As 245 mm²

Class	Rp0.2 (MPa)	Target preload (kN)	Dry / Black K 0.18–0.22 · N·m	Electro Zinc K 0.15–0.2 · N·m	Hot-Dip Galv. K 0.18–0.25 · N·m	Oiled K 0.12–0.15 · N·m	Wax / PTFE / Anti-seize K 0.08–0.12 · N·m
4.8	340	**58.3**	233 210–257	198 175–233	257 210–292	152 140–175	117 93–140
8.8	640	**109.8**	439 395–483	373 329–439	483 395–549	285 263–329	220 176–263
10.9	940	**161.2**	645 580–709	548 484–645	709 580–806	419 387–484	322 258–387
12.9	1100	**188.7**	755 679–830	641 566–755	830 679–943	490 453–566	377 302–453
A2-70	450	**77.2**	309 278–340	262 232–309	340 278–386	201 185–232	154 123–185
A4-80	600	**102.9**	412 370–453	350 309–412	453 370–515	268 247–309	206 165–247

Torque follows the K-factor (nut factor) method T = K·D·F: D is the nominal diameter and F the target preload = 70% of Rp0.2 × thread stress area (M20 As = 245 mm²). Yield strengths are published values from ISO 898-1 (carbon/alloy steel) and ISO 3506-1 (stainless A2/A4). K follows published empirical ranges per friction condition (Machinery's Handbook; the wax/PTFE/anti-seize band K≈0.10 follows Machine Design test data). The grease/MoS_2 band (K≈0.11) nearly overlaps anti-seize and is available in the calculator instead of a separate column.

Fine-Thread Torque Matrix

Class	Rp0.2 (MPa)	Target preload (kN)	Dry / Black K 0.18–0.22 · N·m	Electro Zinc K 0.15–0.2 · N·m	Hot-Dip Galv. K 0.18–0.25 · N·m	Oiled K 0.12–0.15 · N·m	Wax / PTFE / Anti-seize K 0.08–0.12 · N·m
4.8	340	**64.7**	259 233–285	220 194–259	285 233–324	168 155–194	129 104–155
8.8	640	**121.9**	487 439–536	414 366–487	536 439–609	317 292–366	244 195–292
10.9	940	**179**	716 644–787	609 537–716	787 644–895	465 430–537	358 286–430
12.9	1100	**209.4**	838 754–922	712 628–838	922 754–1047	545 503–628	419 335–503
A2-70	450	**85.7**	343 308–377	291 257–343	377 308–428	223 206–257	171 137–206
A4-80	600	**114.2**	457 411–503	388 343–457	503 411–571	297 274–343	228 183–274

Cell shows the typical value; the small line below is the range (min–max).

Basis of Calculation & Sources

Boundary: this chart is a simplified K-factor estimate, not a full VDI 2230 analysis (which accounts for joint resilience, embedment and assembly method). Friction is the dominant variable — no single torque value exists without its friction state. Always follow the design specification or manufacturer torque table.

References

- ISO 898-1:2013 — Mechanical properties of fasteners made of carbon and alloy steel — https://www.iso.org/standard/60610.html
- ISO 3506-1:2020 — Mechanical properties of corrosion-resistant stainless steel fasteners (A2/A4) — https://www.iso.org/standard/70045.html
- GB/T 3098.1-2010 — Mechanical properties of bolts, screws and studs (CN national standard, official full text) — https://openstd.samr.gov.cn/bzgk/gb/std?std_no=GB%2FT%203098.1-2010
- GB/T 3098.6-2014 — Mechanical properties of stainless steel bolts, screws and studs (CN, official full text) — https://openstd.samr.gov.cn/bzgk/gb/std?std_no=GB%2FT%203098.6-2014
- ISO 16047:2005 — Fasteners: torque/clamp force testing (K-factor measurement method)
- Machinery's Handbook (30th ed.) — empirical K-factor ranges
- Machine Design — anti-seize compound friction test (K≈0.10)

Disclaimer: This chart is an engineering estimation for selection and budgeting only. It does not constitute assembly instructions or acceptance criteria.

Bolt Torque Chart — M20 — Yaxiio full-range reference PDF, pack v1 · generated 2026-09-10 · data source: yaxiio-customer/utils/fastenerCalc.ts (single source of truth) · methodology matches the online tool pages · https://www.yaxiio.com/en/tools/bolt-torque-chart/m20